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H. OSSWALD

STOP MECHANISM FOR DIE PRESSES

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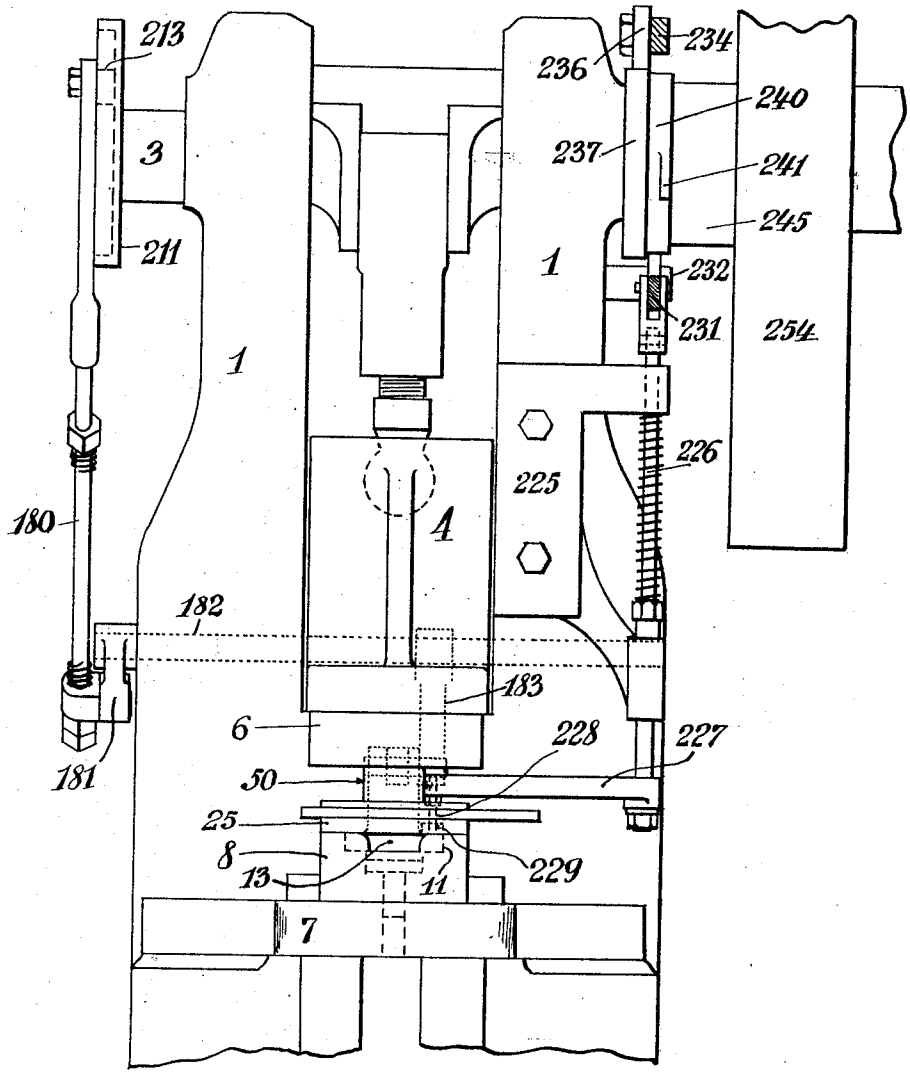


Fig. 1

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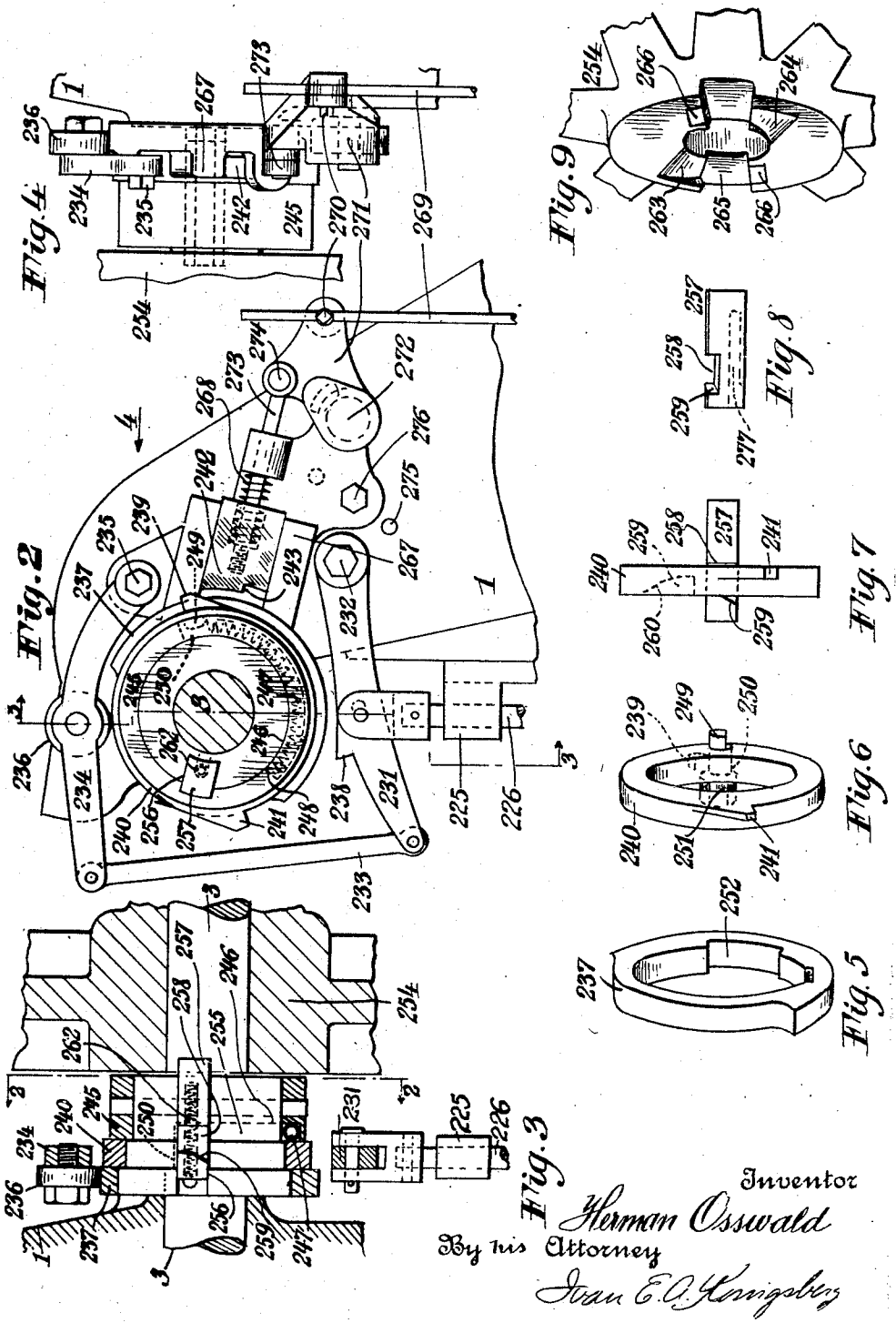


Fig. 4

Fig. 2

Fig. 3

Fig. 9

Fig. 8

Fig. 7

Fig. 6

Fig. 5

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UNITED STATES PATENT OFFICE.

HERMAN OSSWALD, OF NIVERVILLE, NEW YORK.

STOP MECHANISM FOR DIE PRESSES.

Application filed November 10, 1923. Serial No. 673,895.

To all whom it may concern:

Be it known that I, HERMAN OSSWALD, a citizen of the United States, and resident of Niverville, in the county of Columbia and State of New York, have invented certain new and useful Improvements in Stop Mechanisms for Die Presses, of which the following is a specification.

This invention relates to stop mechanism for die presses of the type disclosed in my U. S. Patent No. 1472810 dated November 6, 1923, and the object of the invention is to provide generally improved novel means for automatically stopping the press in the event the work, that is the blanks cut from the metal operated upon by the press, is not properly positioned to be acted upon by the punches used for cutting or forming the blanks to produce the desired article.

In the said patent there is disclosed a press having a plurality of punches and dies for forming the articles. The material from which the blanks are formed is sheet metal or similar material, and the blanks are conveyed from one co-operating punch and die to another, adjacent, co-operating punch and die. The conveying means is in the form of a slide, called a transfer slide. The stop mechanism actuates a registering or safety member in the form of a pin adapted to enter a hole in the said slide during the operation. If, however, for some reason, the slide is so operated that the safety member can not enter said hole in the slide, means are provided for stopping the machine.

Accordingly my invention is embodied in a safety or stop mechanism for die presses arranged and designed as hereinafter set forth, while reference is had to the accompanying drawings in which

Fig. 1 is an outline view in elevation of a die press embodying the invention.

Fig. 2 is a view in elevation of the right side of the press showing the safety stop mechanism with parts in section on the line 2—2 of Figure 3.

Fig. 3 is a sectional view on substantially the line 3—3 of Figure 2.

Figure 4 is a rear view of Figure 2 looking in the direction of arrow 4 in Figure 2.

Fig. 5 is a perspective view of the safety stop cam used in the safety stop mechanism.

Fig. 6 is a perspective view of the safety stop.

Fig. 7 is a detail view of the safety stop and the clutch dog.

Fig. 8 is a view of the clutch dog.

Fig. 9 is a perspective view of the inside hub portion of the flywheel.

Referring to Figure 1 the reference numeral 1 denotes the main frame of the press. At the top is mounted the driving shaft 3, which operates a vertically reciprocating slide 4, suitably guided. The slide 4 carries a punch holder 6. The frame supports a bolster 7. The punches are arranged in a single row in the punch holder 6. In the drawing only the first punch 50 for blanking or cutting the blank from the sheet metal is shown. The cutting punch cooperates with a cutting die located within a die base 25. The dies are supported in a die bed 8. The means for conveying the blanks is in the form of a transfer slide 13 which moves in a slot 11 in the die bed.

The transfer slide 13 is moved or reciprocated lengthwise of the machine by means of an arm 183 carried by a rock shaft 182. The latter is rocked or oscillated from the driving shaft 3 by means of a cam 211, cam roll 213, link 180 and arm 181 in an obvious manner.

For details of the above described parts reference is had to the aforesaid patent, said parts being shown and described herein only generally.

Referring now more specifically to the safety or stopping means, the numeral 225, Fig. 1, denotes a bracket secured to the frame 1. 226 is a rod which slides in the bracket.

The rod carries an arm 227 in which is adjustably secured a safety stop pin 228 adapted to enter an aperture or hole 229 in the transfer slide 13, see Figure 1. The safety rod 226 is pivoted at its upper end to a safety rod arm 231 pivoted on the frame at 232. The free end of said arm is pivoted to a link 233 which in turn is pivoted to a safety cam lever 234. The latter is pivoted to the frame at 235 and carries a cam roll 236 which runs on the safety stop cam 237. The rod 226 is surrounded by a spring 280 which assists in bringing the rod down and keeps the roll 236 on the cam 237.

During the regular operation of the press the safety rod is operated in synchronism with the transfer slide so that the safety pin 228 enters the safety hole 229 once during

each revolution of the press. If, however, for some reason or other, the slide 13 is so operated that the stop pin 228 can not enter the hole 229, the safety rod 226 will of course remain in an elevated abnormal position and a catch 238 on the said arm 231 will remain in the path of a tooth 239 carried by the safety stop 240, Figure 2.

The safety stop is in the form of a ring 240 loosely carried on the shaft 3 and provided with one tooth 239 adapted to cooperate with the said catch 238 and another tooth 241 adapted to cooperate with the switch 242 by engaging a step 243 thereon. The said two teeth are in different planes as shown. Adjacent the safety stop there is pinned to the shaft 3 a clutch ring 245 which is an annular member provided with a groove 246 in which lies a spring 247. The one end of the spring bears against the end 248 of said groove 246. The other end of the spring bears against a lug 249, said lug 249 being the one end of a clutch dog actuating member 250 which is carried in the safety stop 240 and which has a head 251 which plays in a cut out 252 in the safety stop cam 237, see Figures 2 to 6.

As seen in Figure 3, the shaft 3 is enlarged between the frame 1 and the flywheel 254, the enlarged portion being marked 255. In the latter is cut a groove 256 in which slides the clutch dog 257, Figure 8, which has a notch 258 with a cam surface 259. The notch 258 is of a width equal to the width of the safety stop 240 and the latter occupies the said notch. In addition, the safety stop is provided with a cut out 259 having a cam surface 260. The clutch dog is provided with a recess 277 which is occupied by a spring 262 which tends to move the dog into engagement with the flywheel 254. The latter is provided with two diametrically opposite sloping or inclined surfaces 263 and 264 which lead into a diametrically cut groove 265 and opposite the said surfaces the flywheel is provided with hardened steel pins of which only the heads 266 appear in Figure 9.

The aforesaid switch 242 is mounted to slide in a housing 267 and is urged towards the clutch mechanism by a spring 268. The switch may be withdrawn from the clutch mechanism by operating the treadle rod 269 which is in pivotal engagement at 270 with an arm 271 pivoted at 272 to which the switch stem 273 is pivoted at 274. The stem 273 is screwed into the switch. Holes 275 are provided in the press frame for securing the switch housing 267 in different adjusted positions by means of a bolt 276.

The operation is as follows: When the press stands still the clutch dog 257 lies wholly within the groove 256 in the shaft and is withdrawn from the flywheel which we will assume is rotating. In this case the switch 242 will be in its forward position, the tooth 241 will be up against the step 243 on the switch and the circular spring 247 will be compressed between the groove 246 and the lug 249, the head 251 of the member 250 being against the one end of the cut out 252 in the safety stop cam 237. The relative position of the safety stop 240 and clutch dog 257 will be as in Figure 7. The dog spring 262 within the recess 277 will be compressed. It is to be noted that in Figures 2, 3 and 4 the parts are shown in running position.

When it is desired to start the press, the operator puts his foot on the treadle, (not shown) and the treadle rod 269 is depressed thereby withdrawing the switch 242 and releasing tooth 241 on the safety stop. Consequently the latter is free to rotate and is thrown in the direcion of rotation (anticlockwise in Figure 2) by the spring 247, which acts between the end 248 of the groove 246 in the clutch ring (which is secured to the shaft) and the lug 249 carried by the safety stop 240 (which is loose on the shaft and free to operate). This movement brings the cut out 259 in the safety stop opposite the clutch dog, consequently the latter is released and the spring 262 throws the clutch dog into engagement with the flywheel, the dog sliding down one of the surfaces 263 or 264 and against one of the hardened steel pins 266. Thus the flywheel is clutched to the shaft and the press starts operating.

During the operation the safety rod lever 231 is operated regularly by the safety stop cam to raise and lower the safety stop pin 228 as explained above. The parts are so timed, that the catch 238 on said lever 231 is down to permit the tooth 239 on the safety stop 240 to pass by, while the tooth 241 cannot engage the step 243 on the switch because the latter is withdrawn.

When the operator takes his foot off the treadle, the switch 242 will be moved inward by the spring 268, consequently said switch will be in the path of the tooth 241 (these two elements being in the same plane) and when they meet, the switch will stop the safety stop 240. Immediately thereafter the rotating clutch dog will run against the cam surface 260 of the safety stop and will be withdrawn from the flywheel and the press will stop. From the moment the stop tooth 241 engages the stop 243 on the switch and until the clutch dog has been withdrawn from the flywheel the safety stop cam 237 will keep rotating with the shaft but will not affect the other parts because the cut out 252 in the cam will run over the head 251 until the head reaches the end of said cut out 252 which of course is proportioned so as to be long enough to permit the dog to be disengaged from the flywheel.

Similarly, if during the running of the press, the safety stop pin is unable to properly register and enter the safety hole 229 in the slide 13, the catch 238 on the arm 231 will remain up. The tooth 239 will encounter said catch, the safety stop will be stopped and the clutch dog will be disengaged from the wheel and the press will automatically stop.

It will be understood that the safety mechanism and clutch mechanism work so rapidly, that the press is started and stopped almost instantly when the operator so desires by operating the treadle rod. And the same thing occurs when the safety stop acts.

It will be seen that there is an important advantage in having the safety stop rod operated directly by a cam on the shaft, rather than having it operated by the main slide as has been customary heretofore, in that the action of said safety rod becomes exactly synchronized with the running of the press.

It will be apparent from the patent referred to that the first tool 50, that is the blanking punch, in this case represents a plurality of tools, and that the transferring slide 13 is the means for moving the blanks from one punch and die, that is one tool. to the adjacent punch and die. i. e. another tool.

I claim:—

1. The combination with a plurality of reciprocating tools, a drive shaft for operating them, a drive-wheel and means for locking the drive-wheel to and releasing it from the shaft, of a reciprocating work transferring slide for transferring the work to be acted upon by the tools in succession, said transferring slide having a safety hole, a reciprocating rod arranged to enter said hole when the work is properly centered with respect to the tools, and means under the control of said reciprocating rod for releasing the shaft from the drive-wheel when the work is not centered, a pair of interconnected levers on the said shaft, a cam for operating the same and means for pivoting the said reciprocating rod to one of said levers.

2. The combination with a plurality of reciprocating tools, a drive shaft for operating them, a drive wheel, of a dog carried by the drive shaft for locking the drive wheel to and releasing it from the shaft, a reciprocating work transferring slide for transferring the work to be acted upon by the tools in succession, said transferring slide having a safety hole, a reciprocating rod arranged to enter said hole when the work is properly centered with respect to the tools, and means under the control of said reciprocating rod for disengaging the said dog from the drive shaft to release the latter from the drive wheel when the work is not centered, a safety rod arm, a cam on said shaft for operating said safety rod arm and means for pivoting the said reciprocating rod to the said safety rod arm as and for the purposes described.

HERMAN OSSWALD.